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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

EPA Region 5 Records Ctr.



225800

APR 22 1994

VIA FACSIMILE

REPLY TO THE ATTENTION OF

HSE3-5J

Mr. Richard Berggreen
STS Consultants, Ltd.
111 Pfingsten Road
Northbrook, Illinois 60062

RE: Work Plan for the Lindsay Light II Site, Chicago, Illinois

Dear Mr. Berggreen:

Your Work Plan dated March 1994 and Site Safety Plan dated March 1994 have been reviewed. The United States Environmental Protection Agency ("U.S. EPA") was generally pleased with the Work Plan, however, the following matters must be satisfactorily addressed before U. S. EPA can approve any Work Plan:

1. **Page 2, Section 1.1.4, item b--**A 6 meter grid will leave much of the surface area unsurveyed. Past experience is that contaminant sites are not large. Therefore, either a smaller grid should be used where exposure rate is recorded at the grid intersections or, if the larger grid is used, then all grid interiors must be scanned even though the interior values are not recorded. A smaller, 2 meter grid, would be preferable.

--In order to gain maximum sensitivity, surface level measurements should also be made. A sodium iodide scintillometer would be preferable for this surveillance.
2. **Page 2, Section 1.1.4, item c--**It is not clear how much the CPT casing will reduce gamma readings due to shielding. As much as possible, maximum sensitivity is required from gamma readings since high soil concentrations may not show substantially elevated gamma exposure rates.
3. **Page 2, Section 1.1.4, item d--**Total uranium and total thorium analyses will not provide the information necessary to characterize these samples. Isotopic uranium and thorium analyses should be performed.
4. **Page 3, Section 1.1.4, item e--**Delete item.
5. **Page 8, Section 2.0--**Let's close parking lot for a weekend or 24-hour period.

6. **Page 9, Section 2.2, para. 2**--Any restricted area should be delineated by tape, rope or signs.

--An explanation of how 400 uR/hr was selected should be included.
7. **Page 9, Section 2.3, para. 2**--Set a restricted area radius around the sites of subsurface sampling.
8. **Page 11, Section 3.2, item b**--This description contains many of the items requested in comment 1 above. It might be good to make the two sections more alike.
9. **Page 12, item c**--This item commits to one background location. Item c on page 2 commits to 2 background locations. Two are preferred.

--items d/e--Isotopic uranium and thorium are preferred to total uranium and thorium for soils as comment 3 above notes. Delete item e.
10. **Page 12, Section 3.2.1, para. 1**--See previous comments on 6 meter grid.
11. **Page 13, Section 3.2.2, para. 1**--With a 45 meter length, this is only 7 or maybe 8 transects. This is a coarse grid. Thorough intergrid surveys are essential to compensate.
12. **Page 14, para. 1**--The scintillometer, since it is the more sensitive instrument, would be better used as the seek and find instrument, followed by quantitative dose rate readings.
13. **Page 15, para. 1**--Based upon past experience, very small gamma exposure rate changes can indicate large concentration changes. Consequently, it is very likely that a steel casing will severely reduce the sensitivity of the gamma logger. Thin casing, or if possible, no casing, should be seriously considered.
14. **Page 15, para. 2**--The logging operation should be explained in more detail. It appears that the readings are continuous as opposed to incremental. Therefore, logging speed is critical to sensitivity and detectability.
15. **Page 16, para. 1**--If you intend to sample near the parking booth area, please check for underground utilities. Also, earlier in the Work Plan, there should be a statement about having utilities marked .
16. **Page 16, para. 3**--Since cleanup criteria will be based upon radium-226 and radium-228, quantitative analyses of these

radionuclides are essential.

--The parenthetical expression is not explained. It should be.

15. **Page 17, para. 4**--Total uranium, total thorium concentrations will be of dubious value. Isotopic concentrations should be performed.
16. **Page 17, para. 5**--Explain why the fourth RCRA characteristic of reactivity will not be measured for. Table 3-1 indicates there will be a reactivity analysis.
17. **Page 18, Section 3.2.5, para. 2**--Delete entire section.
18. **Page 21, Section 3.2.9**--Detailed procedures for the decontamination of equipment should be provided or referenced. This procedure should include survey methods determining fixed and removal contamination and should identify applicable release criteria.
19. **Page 23, Section 3.3.2.1**--Change "Measurements will be taken in cased gamma radiation" to "Measurements will be taken in cased CPT borings from the ground surface to depths where readings indicate background levels of gamma radiation or natural soils are reached, whichever is the greatest depth".
20. **Page 24, para. 3**--This paragraph states the CPT cone will be advanced to 16 feet. Page 14, paragraph 2 states the holes will be approximately 20 feet deep. There should be consistency between these paragraphs.

--In addition, the 1992 STS Site Investigation identified the shallow water table at about 12 feet below the surface. Clarify how this will effect gamma logging and the subsequent radionuclide concentration determinations.

--The text states that the 4 inch diameter core will be screened for radiation and as appropriate, placed in a 55 gallon storage drum for management and disposal. Define what exposure rate will trigger sample disposal.
21. **Page 25, Section 3.3.2.4**--Consideration should be given to increments of at least 15 centimeters (6 inches) since this depth will be part of the cleanup criteria (5 pCi/g Ra-226 + Ra-228 averaged over 15 centimeter layers).
22. **Page 26, Section 3.3.2.7**--The text states that decontamination of CPT rig will be performed utilizing a TSP solution and potable water. Section 3.2.9.1 states that decontamination of the CPT rig will be performed utilizing non-phosphate detergent wash. Please clarify these noted inconsistencies.

--The text should clarify how wash waters and solids will be recovered from decontamination procedures.

23. **Page 28, Section 3.3.3.4**--In addition to a boring, field activities should be documented utilizing field logbooks. Field logbooks will provide a means for recording all data collection activities. As such, all logbooks should contain sequentially numbered pages. Entries should be described in as much detail as possible so that persons going to the site could reconstruct a particular situation without reliance on memory. Logbooks should be stored in a document control center when not in use. Each logbook should be identified by the project-specific document number.
24. **Page 31, para. 4**--Delete this paragraph.
25. **Figure 3-2**--The half-life for Ra-228 is out of date. It should be 5.75 years.

--It might be appropriate to have a Thorium Decay Chain figure consistent with the Uranium Decay Chain figure.
26. **Figure 3-3**--The special labelling of various radionuclide boxes is unclear (e.g., Radium-226, polonium-218, etc.). A legend would help.
27. **Page 32, Section 4.1**--We recommend that a composite of residual sample material be sent to ITAS Laboratories and analyzed by gamma isotopic analysis. Envirocare will require material to be pre-screened by a Utah certified laboratory before disposal is accepted.
28. **Page 35, Section 6.2**-- Delete entire section including Work Plan Change Request Form.
29. **Tables Appendix**--Reactivity is listed here for RCRA analysis but was not included in the text on page 17, paragraph 5. Reactivity should be added to the page 17 text.

--The essential radionuclides for soil analyses are radium-228 and radium-226. These are the radionuclides upon which cleanup criteria will be based. Every effort should be made to include these in the gamma spectral analysis. It is also assumed that all radionuclides found, whether in these decay series or not, will be reported.
29. **Attachment A, Radiological Control Procedure 40**--This procedure is listed as RCP No. 41 at the bottom of the page.
30. **Page 2 of 4, Section 4.2.1**--The procedure should identify conditions that will trigger re-calibration of Bicron and the RS-2 frisker with HP-210 probe (frisker).
31. This is an overland gamma survey procedure and does not seem

appropriate for a frisker.

32. **Attachment B, Radiological Control Procedure RP-41**--The energy range of the Bicron Micro Rem meter is listed with a peak of 1.2 MeV. The characteristic energy of thorium decay products is 2.61 MeV (thallium-208). Other significant decay products of the uranium and thorium chains have energies above 1.2 MeV. Justify why the Bicron meter will be appropriate for this project.

--Clarify when instrument performance checks will be made (every morning?), with what sources (Cs-137?), and, if cross compared, with what other instruments (Reuter-Stokes pressurized ion chamber?).

33. **Attachment B, Radiological Control Procedure, Gamma Logging, page 3**--If there is a way to reduce the shielding from the well casing this should be done. Maximum sensitivity is necessary. Something much less dense than a steel casing would be preferable, perhaps, no casing if possible.

--page 4--Since cleanup criteria will be based on concentrations in 15 centimeter (6 inch) layers, an effort should be made to obtain data in similar thicknesses.

34. **Attachment C, Page 2 of 3, Section 5.1**--Source check control limits should be provided. A source check should be performed again, at the end of the day, to verify that the instrument stayed within established control limits.
35. **Radiologic Control Procedures - General** - This work plan identifies that the frisker will be used during this project. It would be appropriate for this appendix to include operating instructions for this instrument. In addition, a procedure should be included to determine fixed and removable contamination.

The following comments are in regard to your site safety plan:

1. Where are the regulations for the Illinois Department of Nuclear Safety?
2. **Page B-11**, Direct monitoring can be done by pocket dosimeters. The crew can monitor their hot zone exposure and document the results prior to exiting the results prior to exiting the hot zone.
3. Explain the rationale behind the action levels given in the text on pages B-12 to B-15.
4. **Page B-17**, "The PID monitoring should be continuous while drilling is occurring" should be stated in the safety plan.
5. **Page B-18**, Why is a clinic in area code (801) included?

Also, why was Verteran's hospital selected? Any hospital included should be located on a map.

Comments regarding your Quality Assurance Project Plan (QAP) are as follows:

1. Correct title page--change "Vernetta" to "Verneta" and delete "remedial investigation".
2. Explain the rationale for selecting the Bicron Micro Rem for the overland gamma survey.
3. QA level 3 is more than needed for samples collected under this Administrative Order by Consent.

Section 4.1, Page 1 of 2, (Responsibilities and Functions)

4. International Technology (IT) should be listed and their responsibilities defined. Also, an IT contact should be provided.
5. If there are additional sub-contractors involved in this project which are not depicted in this section they should be listed and responsibilities defined. Also, a statement should be included within the body of this document that binds all sub-contractors to the terms and conditions of this QAP.

Section 5.0 Data, Page 1 of 3 (Data Quality Objectives)

6. Completeness, Comparability and Representativeness were not discussed in this Section. This section should be titled "Quality Assurance Objectives for Measurement of Data in Terms of Precision, Accuracy, Completeness, Representitvness and Comparability."

Table 5-1, Page 3 of 3

7. List the analytical method that IT will use to identify radioactive compounds i.e., gamma/alpha spectroscopy.
8. List the contaminants that groundwater will be analyzed for i.e., RCRA hazard constituents and radionuclides.

Section 6.1, Page 2 of 5, paragraph 1 (Field Operations)

9. **General--** This section should discuss procedures for the shipment of radioactive samples. Radioactive materials are, by definition hazardous and are subject to stringent regulations set forth U.S Department of Transportation and the Nuclear Regulatory Commission (NRC). At minimum a statement should be included to insure that all radioactive materials samples above limits st forth in 49 CFR 171 through 177 will be shipped in accordance with all

appropriate regulations.

10. In addition to stating the predefined accuracy ranges set by the manufacturer, accuracy checks for the Bicron Micro Rem survey meter should be checked on a daily basis while in the field. Acceptable field accuracy result ranges should be provided.
11. The Ludlum 4410 coupled to a 2 X 2 sodium iodide detector was identified in the work plan as a field instrument that will be used during this project. However, field accuracy and precision limits for this instrument are not discussed in this section.
12. A geiger mueller pancake probe coupled to a ratemeter was identified in the work plan as an instrument that will be used during this project. However, field accuracy and precision limits for this instrument are not discussed in this section.
13. The type and frequency of field quality assurance samples should be provided and discussed i.e., duplicate, split, and field blanks. The work plan identified that a minimum of 14 samples, including QC samples will be analyzed, however these QA samples are not specifically discussed in the QAPjP.

Paragraph 2

14. If groundwater samples are to be analyzed for radionuclides these samples should be acidified to a ph of 2 or less while in the field.

Section 6.2, Page 2 of 5 (Lab Operations)

15. The ITAS radioanalytic methods that will be used to analyze samples for this project should be listed.
16. The type and frequency of laboratory quality assurance samples should be provided and discussed i.e. spikes/matrix spikes.
17. Target compounds should be listed.
18. Laboratory analytical detection limits should be provided or referenced. The reference should include page and section number.
19. The fundamental QA objective with respect to accuracy, precision and sensitivity of laboratory analysis is to meet the QC acceptance criteria of analytical protocols. Laboratory acceptance criteria and the methods used to assess laboratory accuracy and analytical precision should be discussed or referenced. The reference should include

the page and section number. The final data package should state whether the radioanalytic methods met the QC acceptance criteria.

Section 7.0, Page 1 of 4 (Calibration Procedures and Frequency)

20. Calibration procedures and frequency should be included (or referenced) for the Ludlum model 44-10 high energy 2 x 2 in. NaI gamma scintillometer. Include procedures for daily sensitivity runs, plateau determinations, and electronic calibration of the 44-10.
21. Calibration procedures and frequency should be included for the GM pancake probe.
22. Other radiation detection equipment that was not mentioned in this QAPjP but may be used during this project should be included in this section.
23. Discuss what actions will be taken if radiation instruments fail daily field source checks.
24. Figure 7.0-3 is a copy of the certificate of calibration for the Strontium-90 beta reference source. The bicron was calibrated with cesium-137. There should be additional text added to discuss how this source is used.

Section 9.0, Page 1 of 1 (Data Reduction Validation and Reporting)

25. The acceptance criteria (QA/QC requirements) that the site Quality Assurance Officer will be using to evaluate the ITAS laboratory analytical data should be provided.
26. The contents of the ITAS data package should be described.
27. Section 10.0 Page 1 of 1 (Internal Quality Control Checks)
28. Identify the other analytical laboratory who will be analyzing the split soil samples.

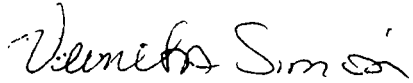
Section 13.0 Page 1 of 2 (Procedures to Assess DQOs)

29. Calculations to assess laboratory analytical precision, accuracy, and completeness should be provided.

U.S. EPA requests that the above matters be satisfactorily addressed and incorporated into a revised Work Plan and sent to U.S. EPA within two weeks of this correspondence.

Please remember our meeting on Monday, April 25, 1994, scheduled from 9:00 a.m. to 11:00 a.m. in Room 612 and if necessary we may teleconference MJW Corporation and IT Corporation Laboratory.

Sincerely,

A handwritten signature in cursive script, appearing to read "Verneta Simon".

Verneta Simon
On-Scene Coordinator